

WHAT IS CLAIMED IS:

1. An apparatus for manufacturing a metal-ceramic composite member that joins metal onto a surface of a ceramic member by a direct joining strength of a ceramic and a metal on an interface therebetween in such a manner that the ceramic member is placed in a mold member, a molten metal to be joined is poured into the mold member so as to come into contact with the surface of the ceramic member, and the molten metal is cooled and solidified, the manufacturing apparatus comprising:
 10. a plurality of process regions; and a passage member extending along said plural process regions, that allows the mold member to pass therethrough, wherein the molten metal to be joined is poured while the mold member is passing through said passage member practically in a shielded state from the atmosphere.
 15. 2. An apparatus for manufacturing a metal-ceramic composite member according to claim 1, wherein the mold member is held tightly by said passage member.
20. 3. An apparatus for manufacturing a metal-ceramic composite member according to claim 1 or claim 2, wherein a predetermined amount of the molten metal to be joined is poured to the mold member by pressure.
25. 4. An apparatus for manufacturing a metal-ceramic composite member according to any one of claim 1 to claim 3, wherein the molten metal to be joined is made to flow while being in contact with the mold member and poured so as to come into contact with the surface of the ceramic member.
30. 5. A mold member according to any one of claim 1 to claim 4, wherein the ceramic member is placed horizontally in a mounting portion in the mold member, utilizing a self-weight of the ceramic member.

6. A mold member according to any one of claim 1 to claim 5, comprising

5 a shrinkage cavity inducing portion provided in the mold member, that causes a shrinkage cavity of the metal to be generated therein when the molten metal is cooled.

7. A method for manufacturing a metal-ceramic composite member, comprising:

10 placing a ceramic member in a mold member;

pouring a molten metal to be joined into the mold member so as to bring the molten metal into contact with a surface of the ceramic member; and

15 cooling and solidifying the molten metal to join the metal onto the surface of the ceramic member by a direct joining strength of the ceramic and the metal on an interface therebetween,

wherein the molten metal to be joined is poured while the mold member is passing through a passage member extending along a plurality of process regions, practically in a shielded state from the atmosphere.

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8. A method for manufacturing a metal-ceramic composite member according to claim 7, wherein the solidification is made to progress in one direction when the molten metal is cooled and solidified.

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9. A method for manufacturing a metal-ceramic composite member according to claim 7 or claim 8,

wherein the metal is aluminum or an alloy essentially consisting of aluminum, and

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wherein the ceramic member is any one of an oxide, a nitride, and a carbide of aluminum, and an oxide, a nitride, and a carbide of silicon.

10. A metal-ceramic composite member manufactured by a method for

manufacturing a metal-ceramic composite member according to any one of claim 7 to claim 9, the metal-ceramic composite member comprising:

a ceramic member; and

5 metal members or metal plates joined on both sides of said ceramic member,

wherein said metal member or metal plate on one side of said ceramic member is patterned to be used as a wiring material and an electronic device is disposed thereon, and said metal member or metal plate on the other side of said ceramic member serves as a heat sink plate or a heat release fin.